a case the same physical cause producing a maximum of rainfall at a northern station, at the same time as a minimum at a southern station. This is merely a suggestion to show the caution which may be necessary before we accept without qualification any fixed rule as to the similar actions of the same physical cause at Madras, Calcutta, and Bombay.

It may be asked to what extent the Trevandrum series of observations confirms the results given in NATURE (vol. xvi. p. 252) for Madras and Bombay, relatively to the ten-yearly period. I may point out that the Trevandrum series comprises only three and a half cycles, too few for any very satisfactory conclusion. It is easy, however, to inquire to what extent the Madras and Trevandrum series agree during the time we have observations from both (1838-1876). Should they give the same result for these thirty-eight years, whatever that result may be, we may fairly conclude as to the probability of Trevandrum giving generally the same result as Madras.

An examination of the yearly rainfalls at the two stations during this period shows in a very marked way a cycle of about five years, or a double oscillation in the decennial period; and this for seven successive oscillations. I have in consequence sought the equations of sines giving the most probable representation of the mean oscillations (single and double) for the ten and a half year period at the two stations from the thirty-eight years' observations; these are as follow, (y) being the yearly rainfall in inches :—

$$\begin{aligned} &\text{Madras} \ \ldots \quad y = 5{\cdot}4 \sin(\theta + 50^\circ) + 4{\cdot}6 \sin(2\theta + 252^\circ), \\ &\text{Trevandrum} \ y = 5{\cdot}6 \sin(\theta - 17^\circ) + 8{\cdot}4 \sin(2\theta + 259^\circ). \end{aligned}$$

While the series are too short for any certain conclusions yet the general agreement of the equations for the two places is quite distinct.[1]

What I desire especially to point out is the large *double* oscillation in the ten and a half year cycle; at Trevandrum (where there are *two* monsoons) the mean range amounts to 16·8 inches; it is only 9·2 inches at Madras; but the epochs of maximum and minimum are very nearly the same at both stations as shown by the angles 252° and 259°. Also these angles give the epochs of *minimum* rainfall both in the years of minimum and of maximum sun-spots.

It is not my intention to seek an explanation of this result, especially (though well shown seven times in succession) since it requires more extensive investigation, like that for ten and a half years, before any considerable weight can be given to it; I have thought it desirable, however, to bring this oscillation to the notice of investigators. The object of men of science is not to prove or disprove a case but to ascertain the truth. We are only groping at present in the darkness, yet it is not merely possible but probable that results of great practical importance may be derived from a conjoint study of terrestrial and solar physics, though they may not be the precise results which were expected or, it may be, desired. I shall endeavour at another time to give reasons for believing this.

Putting aside all that has hitherto been considered glorious to a nation in advancing science for its own sake; if we remember the vast human suffering that may be alleviated hereafter by encouraging now the study of solar actions as observed on the sun's surface, and as felt on our globe by the trembling magnet, the heaving air, and, it may be, the falling rain, there will I think be few, who know a tithe of what science has already done for humanity, who will not join in the demand for the small sum required from the nation's resources for so great an end.

JOHN ALLAN BROUN

NOTES

THE Lavoisier medal of the French Society for the Encouragement of Industry has been awarded for the present year to Mr. Walter Weldon, for the great progress realized by his manufacture of bleaching powder. This medal is seldom awarded—among the few recipients being Henri St. Claire Deville, Henri Giffard, Boussingault, Ferdinand de Lesseps, and Sir Charles Wheatstone. The presentation was made by M. Dumas, who delivered an eloquent address.

AT the next session of the French Association for the Advancement of Science, the committee appointed on meteorology will propose to memorialize the Cabinet to create a Meteorological Institute, in which will be centralized all the meteorological institutions of France, thus severing the connection between them and the Paris Observatory.

THE number of stations of the French Agricultural Meteorological Service was 1,149 on July 1. All the departments except five, the poorest and the least educated, are possessed of stations. The service was inaugurated last August. Not more than 3,600 French communes are said to have telegraphic stations, so that the third part of the communes in a position to enjoy daily telegrams have availed themselves of the opportunity in less than one year. The French Agricultural and Marine Meteorological Service has a very limited credit, not more than 30,000 francs.

IN the royal castle at Nürnberg the well-known Himalayan traveller Hermann v. Schlagintweit-Sakünlünski is exhibiting the large collection made by himself and his two brothers Adolf and Robert during their travels in India and High Asia.

THE proposal to found a popular Astronomical Institute at Hamburg, advocated by the optician Dr. Hugo Schröder, has been received with general favour. Indeed the project has so far exceeded the original proposal as to include a zoological garden, an aquarium, and, in fact, a great institute for the spread of scientific knowledge. Popular lectures will be given at the institute, which will be furnished with a refractor costing 188,000 marks, a dozen of the best microscopes, a model of the world, planetaria, &c. The first cost is estimated at 600,000 marks.

A PROPOSITION has been made by influential members of the Municipal Council of Paris to establish a regular course of lectures on astronomy at the Montsouris Observatory. There has been no public lectureships on astronomy at Paris since Arago died, except at the Sorbonne and Collége de France, but none of these lectures are for beginners.

TWO living specimens of the Colorado beetle were found in Liverpool docks last week; one was taken on Wednesday on board the Spanish *S.S. Carolina*, which arrived about a week previously from New York, bringing sixty head of large cattle from Texas; and it was supposed to have come in the fodder for the cattle, which consisted of hay and maize. This was stored on deck above the after hatchway close to the saloon, and the beetle was taken crawling up the wall inside the saloon near the ceiling. The weather having been warm the windows had been open, and it could easily find admittance from the adjoining fodder, which was all but exhausted. Some delay took place in getting the ship into dock, and the cattle disembarked in consequence of a misunderstanding as to the regulations regarding the importation of cattle, so that about a week elapsed before the ship got into dock; and by the time she did get in fresh fodder had immediately to be got to supply the cattle. This relieves any anxiety which might otherwise have been felt as to other specimens having been distributed on shore with any surplus fodder. The history of the other specimen was not so clearly traced. It was said to have fallen from a steamer on to a sail of some craft, and to have been picked up by a bargeman, who gave it to a gentleman who took it for identification to Mr. Moore of the Free Library and Museum. But as far as can be learned it appears to have been taken, if not in the same dock at least in the same region of docks as the other one, so may have possibly also come from the same source. Credit is due to Mr. Moore for the promptitude with which he at once telegraphed to the Privy Council the occurrence of both of these specimens. It is only by such prompt co-operation that the Privy Council can expect success in their efforts to exclude this dreaded pest.

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[1] The preceding equations cannot be compared with those for Madras and Bombay (NATURE, vol. xvi. p. 252), since here $\theta = 0$, for 1838·5, so that the term for the single oscillation does not agree with that found previously from the longer series at Madras.

Details are to hand of the volcanic eruption in Ecuador, on June 26, referred to in last week's Nature. The eruption is supposed to have originated in Cotopaxi, and the enormous quantity of ashes ejected has spread desolation over a wide area. A calculation has been made of the quantity of ashes which had fallen in thirty hours, and it was estimated that on each square kilometer of space 313 kilogrammes of ashes had fallen. A mineralogical analysis of the ashes was made with the following result:—Volcanic ashes composed of exceedingly fine particles of lodestone, vitreous feldspar, hornblende, and an amorphous substance. The eruption was accompanied by an enormous and destructive flood of mud and water which swept down the rivers Cutuchi, San Felipe, and Yanayaco.

We have received the Tenth Report of the Peabody Museum of American Archæology and Ethnology, at Harvard University From this we notice that the scope of the Annual Reports of the Museum has been enlarged, and that it is proposed to print special papers on American archæological and ethnological matters, so far as the funds will permit. The Museum authorities are anxious to receive exchanges for its reports, over 200 copies of which are now sent to foreign societies, journals, &c, of kindred character, but thus far very few returns have been received. We regret to see that of these few only two or three come from England. As the formation of a working library is one of the objects of the Museum, we would earnestly urge upon all workers in this department to lend their aid by sending copies of any papers they may publish, and upon all who receive copies of the valuable Museum Reports to make what return they can.

Under the conjoint auspices of the Smithsonian Institution and the Peabody Museum of Cambridge (U.S.) Mr. Clark Mills was recently sent to Florida for the purpose of securing casts of a number of Indians held as prisoners of war in the old Spanish fort at St. Augustine. We learn that Mr. Mills has been completely successful in this object, having secured excellent likenesses in plaster of sixty-two Indians, representing some ten or twelve different tribes. These, it is understood, will be used in the preparation of a series of dressed lay figures of Indians in the National Museum.

The Nez Percés Indians, who are now giving a good deal of trouble to the United States Government, belong to the family of the Sahaptins, whose habitat is on both sides of the middle and lower Columbia River and its tributaries. Their reservation in North-western Idaho has given for several years past a census of 1,400, but a large number have refused to live on the reservation or conform to treaties made. Their name, it appears, is a misnomer, the habit of piercing the nose to receive a white shell, having existed only among two other and less important branches of the same family. According to the *Nation*, the Nez Percés, while fierce and haughty, are honest, just, and often charitable. Though their manner is often cold and reserved, they are eminently civil, and on occasion become social and even gay. Quick of temper and prone to resent any apparent fraud or injustice even more than a wanton injury, they are easily appeased, and in general more nearly approach the "noble savage" of romance than any of the aborigines known to the present generation of Americans. They are well and strongly built, of a dark copper colour. The compression of the forehead produced in infancy, almost entirely disappears in adults. The portion of the tribe settled along the Clearwater and Lapwai rivers and their tributaries, and the Kamia, has of late been fairly successful in self-maintenance by farming and stock raising, The "non-treaties" roam on the Clearwater and its branches, and on the Snake about its forks, the Wallowa valley, however, being their favourite pasture ground. They organize great hunting expeditions once or twice every year, and as the buffalo is not now found west of the Rocky Mountains, are forced to cross the Bitter Root range to the plains between the Yellowstone and Missouri rivers, and so come in collision with several tribes of their hereditary foes. Regular fishing encampments are also formed between June and September on their home rivers; and the salmon, with the jerked buffalo meat, and a number of esculent roots, are laid up for their long winters. Stock is their main pride and wealth, however, and the herds of the independent bands are of a highly patriarchal character. Individuals not unfrequently own from one to three thousand horses. The labour connected with these partly devolves on a class of slaves, who are prisoners of war, and their descendants. The Nez Percés have not only been passively peaceable and friendly ever since the Louisiana purchase of 1803, but they have been steadfast allies of the U. S. Government in troublous times; and the conduct of the General Government towards them appears to betray a want of common sense and honesty, to say nothing of gratitude for tried and valuable fidelity.

The scientific press of Paris lost last week one of its most useful and respected members, M. Montucci, the scientific critic of *Galignani's Messenger*, who died after a short illness, at the age of seventy. Dr. Henry Montucci, a German by birth, had become a Frenchman by naturalisation. He wrote a number of books in the French language on scientific subjects, his last work being a "Theory of Progress." He has written a number of papers on mathematics, which have been printed in the *Comptes Rendus* of the French Academy of Sciences. He was sent in 1868 by the French Government to England and Scotland, to report on the public instruction in these two countries.

The next eclipse of the moon is attracting the notice of physicists and aëronauts in France. It is proposed to make a balloon ascent during the night of August 23-24, in order to ascertain whether, independently of clouds, the eclipsed moon has a bloody tinge.

The new Hôtel Dieu, Paris, is now in working order, and on Saturday, August 11, it was inaugurated by the President of the French Republic. It covers a space of 20,000 square yards, including gardens. Everything has been organised in splendid style, and the most improved methods have been adopted by the architect. The chemical laboratories, on an extended scale, have been organised by the exertions of Dr. Liouville, as we reported eighteen months ago in our "Notes," and they are now fitted up. Probably the principal feature of the new building is the ventilation. This is accomplished by means of two steam-engines of 40 horse-power each, which pump the air to an altitude of 130 feet from the ground. The air is circulated through the rooms of patients after having been filtered, and warmed or cooled, as is deemed advisable, before being admitted. The circulation is to be kept up at a rate of 100 cubic metres per hour per head. The air is filtered again and burned after being used, to destroy infectious germs, when it is sent out.

The Mayor and Corporation of Leamington have invited the Sanitary Institute to hold its Congress in their town, and the invitation has been accepted. The Congress will meet early in October.

PROF. MARSH, in continuation of his investigation of the fossil remains of the Rocky Mountains, announces a new genus and species of toothed bird, which he calls *Baptornis advenus*, basing it upon a tarso-metatarsal bone. He also describes a new fossil lizard, by far exceeding in magnitude any land animal hitherto discovered, which must have been fully fifty to sixty feet in length. It was probably a herbivorous reptile. It comes from a bed on the eastern flank of the Rocky Mountains.

THE additions to the Zoological Society's Gardens include two Rufous Tinamous (*Rhynchotus rufescens*) from South America, presented by Capt. Fairfax, R.N.; a Spotted Cavy (*Coelogenys paca*) and a Coati (*Nasua nasica*) from South America, presented by Mr. J. Trotter; a Gannet (*Sula bassana*), British, presented by Mr. S. N. Sharpe; a Roseate Cockatoo (*Cacatua roseicapilla*) from Australia, presented by Miss Potter.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

LONDON.—The Rev. Philip Magnus, in his address at University College School on the occasion of the distribution of prizes, spoke in high terms of the progress which that school has made since he himself was a pupil in it. He referred especially to the extension of science-teaching to the small boys of the school, the addition of a physical lecture-room and chemical laboratory, and to the fact that the school was one of the first to break down the old grammar-school system of teaching, and to see the importance of scientific instruction as well as instruction in English and other modern languages.

UNIVERSITY COLLEGE, BRISTOL.—The Council have selected as Principal of the College, Mr. Alfred Marshall, M.A., Fellow of St. John's College, Cambridge, who will also hold the Professorship of Political Economy. Several reappointments have been made in the College staff; the Lecturership in Mathematics and Applied Mechanics is still vacant. The second session will begin on October 9, and it is understood that there will be an inaugural meeting of some importance. The College Calendar will shortly be issued.

TÜBINGEN.—On the 10th instant the University of Tübingen celebrated, in true German style, the 400th anniversary of its foundation. Among the other honours conferred was that of Doctor in the Medical Faculty, upon Prof. Tyndall.

JENA.—The University of Jena has conferred upon Sir C. Wyville Thomson the degree of Doctor of Philosophy, "*Honoris causa*."

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, August 6.—M. Peligot in the chair.—Conditions for the principal normals of a curve to be principal normals of a second curve, by M. Serret.—New considerations on the localisation of cerebral centres regulating the co-ordinated movements of articulate and written language, by M. Bouilland. A case described in which a young man lost the power of writing, though there was no indication of a morbid state either in the hand or other parts of the right arm, and which would commonly be called one of writer's cramp, M. Bouilland attributes it to a like cause to that in aphasia, viz., lesion of a cerebral centre regulative of the movements involved. And if the co-ordinating centre for oral language is (as is thought) in the third circumvolution of the left anterior lobe of the brain, it is considered likely that either in this circumvolution or in the nearest part of another, resides the regulative power for the co-operating movements of written language.—Experimental researches made with gases produced by explosion of dynamite on various characters of meteorites and bolides (continued), by M. Daubrée. The angularity of the fragments in many cases indicates that they have been subject to strongly-heated and compressed gases only during a very short time, probably less than a second, having been separated near the end of the bolide's course. Small quantities of gas may give great effects, and M. Daubrée shows that the encounter of a bolide with air in the higher regions of the atmosphere is a fact of the same order with some of his experiments.—Tertiary strata of Vicentin (concluded), by MM. Hebert and Munier-Chalmas.—M. Thenard presented (from M. Videau, of Blanzy) a remarkable specimen of crystallised glass, obtained in a Siemens furnace, acting eight months and a half.—Spherical refraction; exposition of the laws and formulæ of Gauss, starting with the principle of the equivalence of physical forces, by M. Giraud Teulon.—On the formula $2^{2n} + 1$, by M. Pepin.—Observations on a memoir of M. Haton de la Gonpilliere, entitled "Direct and Inverse Developpoids of Various Orders," by Abbé Aoust.—Observations of the planets 170, 171, and 172, at the observatory of Marseilles; discovery of the planet 173 by M. Borrelly, by M. Stephan.—Elements and ephemerides of the planet 148 Gallia, by M. Bossert.—Reply to some of the objections formulated by M. Cosson against the project of formation of a Saharan sea, by M. Roudaire.—Comparative influence of leafy woods and resinous woods on rain and the hygrometric state of the air, by M. Fautrat. If vapours dissolved in the air were apparent like fogs, we should find forests enveloped by a large moist screen, and for pine forests the envelope would be greater than for others. The forest, too, receives more rain than the neighbouring land, and the fact is more pronounced in the case of pine forests than in others. Pines retain in their branches more than half of the water poured on them, while leafy trees let 58 per cent. go to the ground.—On the catechines, by M. Gautier.—On the ovary during pregnancy, by M. De Linety.—On the quantity of hæmoglobin in red blood corpuscles, by M. Malassez. With a new colorimeter he estimated the quantity of hæmoglobin in a cubic millimetre of blood; then, dividing this by the number of corpuscles in the same volume, he arrived at the average quantity of hæmoglobin per corpuscles. In Parisians in the prime of life the number got was 27·7 to 31·9 μμ gr. (or millionths of a millionth of a gramme). In health the "richness in hæmoglobin" varies little in an individual; but in disease it is otherwise. In anæmic persons, the quantity varied between 10 and 25 μμ gr. Birds which have fewer corpuscles than mammalia, have more hæmoglobin in each. The same holds for fish, reptiles, and batrachians, but in these, the increase of hæmoglobin does not as in birds, compensate the diminution in number of corpuscles. Variations in volume (of corpuscles) may explain variations in richness in hæmoglobin among animal species little apart; but for those far apart one must take account of the presence of a nucleus, and suppose also modifications of the globular substance.—Experiments demonstrating that chloroform has not any action either on septicity or on the vibrionians of putrefied blood, by M. Feltz. Chloroform, then, cannot serve for separating in septic putrefied blood the diastasic from the organic ferments.—On a new larval form of Cestoides (second note), by M. Villot.—M. Perez made some observations on M. Fol's opinions regarding fecundation of the egg in the star-fish and sea-urchin.

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